

REMARKS

Applicant respectfully requests that the foregoing amendments be entered at least because they raise no new issues that would require further search or consideration and because they place the application in condition for allowance.

Claim 2 has been cancelled without prejudice or disclaimer.

Claims 1-4 and 8-9 are currently being amended.

New claims 12 and 13 have been added. No new matter has been added.

This amendment changes, adds, and deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1 and 3-13 are now pending in this application.

Rejections under 35 U.S.C. § 112 , first paragraph

Claims 4-8, 10 and 11 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the enablement requirement. Applicant has amended claim 4 to address the issues raised in the Office Action, and respectfully submits that the rejection has been overcome.

Rejections under 35 U.S.C. § 112 , second paragraph

Claims 1-11 stand rejected under 35 U.S.C. § 112, second paragraph. Applicant has amended the claims to address the issues raised in the Office Action, and respectfully submits that the rejection has been overcome.

Rejections under 35 U.S.C. § 103

Claims 1-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,722,085 to Flora et al. (hereafter “Flora”). Applicant respectfully traverses this rejection for at least the following reasons.

Independent method claim 1 includes a data repairing step, where divided data items and parity data are fetched from cache modules (where the divided data items and parity data are respectively stored), and one of the divided data items is repaired, if the one data item is damaged, using the parity data and only remaining ones of the divided data items.¹ Thus, in claim 1, if one of the divided data items is damaged, that data item is repaired using the parity data and only the remaining ones of the divided data items. The Office Action acknowledges on page 7 that “Flora does not explicitly teach the specific use of ‘using said parity data and only the remaining ones of said data item’”, but argues that it would have been obvious to modify the teachings of Flora to include the step of using parity data and only the remaining ones of the data items. Applicant respectfully disagrees.

In the error checking procedure of Flora, the contents of all of the buffers in operation are applied to the error circuitry (see col. 4, line 65 to col. 5, line 25). Thus, Flora fails to suggest that if one of the divided data items is damaged, that data item is repaired using the parity data and only the remaining ones of the divided data items, because all of the buffers in operation are used.

In support of the argument that it would have been obvious to modify Flora, the Office Action cites col. 5, lines 50-57 of Flora. Applicant submits, however, that neither this cited section of Flora, nor any other section, suggests as in claim 1, that when one of the divided data items is damaged, that data item is repaired using the parity data and only the remaining ones of the divided data items. The cited section of Flora discloses that if a disk drive is producing more than a certain number of bit errors, the disk drive can be disconnected and replaced without interfering with normal operation as long as the total number of correctable

¹ Claim 1 has also been amended to specifically recite that “the remaining ones of said divided data items being all of the divided data items other than the one of said divided data items.” Applicant believes that this limitation was implicit in claim 1 before this amendment, and thus the present amendment to claim 1 does not narrow its scope. Claims 2-4 and 9 have been amended in a corresponding, and non-narrowing, fashion.

bit errors (presumably from the disk drive producing errors) is not exceeded. The cited section of Flora only discloses that the Flora system has a tolerance for bit errors up to the number of correctable bits, and thus that a certain number of error producing disks can be tolerated. Significantly, what Flora does not disclose or suggest is that in the correction procedure when a data item is damaged, that only the parity data and the remaining ones of divided data items are used to repair the data item.

Applicant submits that the mere fact that Flora could be modified so that only remaining data bits and parity bits are used to repair bit errors is not sufficient to provide motivation to do so. *See MPEP 2143.01* (“The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination.”) (*citing In re Mills*, 916, F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)). In the present case, Flora only suggests a system that can tolerate a certain number of bit errors. Nowhere does Flora suggest that when one of the divided data items is damaged, that data item is repaired using the parity data and only the remaining ones of the divided data items. If the Examiner maintains the rejection based on Flora, applicant respectfully requests that the Examiner provide a reference suggesting the feature of claim 1 where when one of the divided data items is damaged, that data item is repaired using the parity data and only the remaining ones of the divided data items.

Independent claims 3, 4 and 9 repair damaged divided data items, or divided data items in a damaged module, in a similar fashion to independent claim 1, using the parity data and only the remaining ones of the divided data items. Thus, independent claims 3, 4 and 9 are patentable for at least the same reasons as independent claim 1.

The dependent claims, 5-8 and 10-12, are patentable for at least the same reasons as independent claim 4, from which the dependent claims ultimately depend, as well as for further patentable features recited therein.

New dependent claim 12, for example, recites that the data write-in step of writing the processed data to the disk is executed after the data processing step. With this configuration, even when a cache module fails, data may be recovered at the data processing step. Thus, redundancy of the disk may be maintained. In the Flora system, when data is written into DISK DRIVE 10 as shown in Fig. 3, data is transferred in the following order: ERROR

CIRCUITRY 32 → BUFF 13 → DISK DRIVE (11-0)-(11-38). The Flora system cannot transfer data to the DISK DRIVE (11-0)-(11-38) when the BUFF 13 fails when data is being written into DISK DRIVE 10 because ERROR CIRCUITRY 32 is arranged before BUFF 13 and the data cannot be recovered if BUFF 13 is damaged. In this case, the DISK DRIVE (11-0)-(11-38) loses its redundancy. By contrast in the method of claim 12, even when cache failure occurs, the redundancy of the disk is maintained.

Dependent claim 8, as another example, recites that the number of divided data items is set one smaller than a number of the cache modules, a feature not suggested by Flora. This arrangement of divided data items and cache modules provides advantages not realized by Flora. As discussed on page 13, lines 13-24, such an arrangement allows a greater capacity of the caches to be assigned to the storage of transfer data, allowing mass transfer of the data at a time. Applicant notes the claims as a whole must be considered when determining patentability. Thus, the examiner is required to consider claim 8 as a whole, including its advantages, i.e., the allowance of a greater capacity of the caches to be assigned to the storage of transfer data, allowing mass transfer of the data at a time, when considering patentability.

Moreover, Flora discloses that the bits of each word are separated in 32 separate buffers 13-0 to 13-31 and that seven check bits are separated in 7 separate buffers 13-32 to 13-38. If Flora were modified to have only one buffer containing the check bits, then the Flora system would include only a single check bit per word. In this case, it appears that the error checking capability of the Flora system would be drastically reduced, if it would work at all. Thus one skilled in the art would not modify Flora to allocate a single buffer for the check bits.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of

papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R.
§1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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